Log Event A

Borehole # 40-09-08

Borehole Information

Farm : S	**Tank :** S-109	**Site Number :** 299-W23-203
N-Coord : 35,995	**W-Coord :** 75,907	**TOC Elevation :** 663.00
Water Level, ft :	**Date Drilled :** 3/31/1976	

Casing Record

Type : Steel-welded	Thickness : 0.280	ID, in. : 6
Top Depth, ft. : 0	Bottom Depth, ft. : 100	

Borehole Notes:
This borehole was drilled during March 1976 to a depth of 105 ft and completed to a depth of 100 ft with 6-in.-diameter casing. The driller's log states that the borehole was grouted with 72 gal of grout with 60 gal outside of the casing and 12 gal inside the casing. The driller's log indicates that the bottom 5 ft of the borehole was grouted and that the annular space around the upper 20 ft of casing was also grouted. The driller's log contains no mention of perforations; therefore, it is assumed that the borehole was not perforated. The casing thickness is assumed to be 0.280 in., on the basis of published thickness for schedule-40, 6-in. casing. The zero reference for the SGLS logs is the top of the casing, which is even with the ground surface.

Equipment Information

Logging System : 1	**Detector Type :** HPGe	**Detector Efficiency:** 35.0 %
Calibration Date : 04/1996	**Calibration Reference :** GJPO-HAN-5	**Logging Procedure :** P-GJPO-1783

Log Run Information

Log Run Number : 1	**Log Run Date :** 07/23/1996	**Logging Engineer:** Alan Pearson
Start Depth, ft.: 97.5	**Counting Time, sec.:** 100	**L/R :** L **Shield :** N
Finish Depth, ft. : 0.0	**MSA Interval, ft. :** 0.5	**Log Speed, ft/min.:** n/a

Log Run Number : 2	**Log Run Date :** 07/23/1996	**Logging Engineer:** Alan Pearson
Start Depth, ft.: 70.0	**Counting Time, sec.:** 100	**L/R :** L **Shield :** N
Finish Depth, ft. : 55.0	**MSA Interval, ft. :** 0.5	**Log Speed, ft/min.:** n/a

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Analysis Information

Analyst : D.L. Parker

Data Processing Reference : P-GJPO-1787 Analysis Date : 04/01/1997

Analysis Notes :

This borehole was logged in two log runs using a centralizer; log run two was a rerun of a section logged in run one. The pre- and post-survey field verification spectra met the acceptance criteria established for peak shape and system efficiency. The energy and peak-shape calibration from the field verification spectra that best matched the data were used to establish the channel-to-energy parameters used in processing the spectra acquired during the log runs.

Casing correction factors for a 0.280-in.-thick casing were applied during the analysis.

Cs-137 was the only man-made radionuclide detected in this borehole. Cs-137 contamination was detected at the ground surface and at a depth of 1 ft. A Cs-137 concentration of about 0.4 pCi/g was detected at a depth of 1 ft. A higher Cs-137 concentration was detected at the ground surface, but this concentration is an apparent concentration because the borehole-to-detector geometries at the ground surface do not match the source-to-detector geometries used in the system calibration.

The logs of the naturally occurring radionuclides show an increase in K-40 and Th-232 concentrations at a depth of 20 ft. An additional increase in K-40 concentrations occurs at a depth of about 37 ft. KUT concentrations increase at a depth of about 51 ft. An additional increase in KUT concentrations occurs at a depth of about 66 ft.

The SGLS total count log plot reflects the log plots of the man-made and naturally occurring radionuclides. Details concerning the interpretation of data for this borehole are presented in the Tank Summary Data Report for tank S-109.

Log Plot Notes:

Separate log plots show the man-made and the naturally occurring radionuclides. The natural radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations.

A combination plot includes the man-made and natural radionuclides, the total gamma derived from the spectral data, and the Tank Farms gross gamma log. The gross gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data.

The interval between 55 and 70 ft was relogged as a quality assurance measure to establish the repeatability of the radionuclide concentration measurements. The radionuclide concentrations shown were calculated using the separate data sets provided by the original and rerun logging runs.

Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.